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(54) **METHOD AND SYSTEM FOR INTEGRATING VISUAL CONTROLS WITH LEGACY APPLICATIONS**

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G06F 9/54	(2006.01)
G06F 3/01	(2006.01)

(52) **U.S. Cl.**
CPC ***G06F 9/541*** (2013.01); ***G06F 3/017*** (2013.01)

(58) **Field of Classification Search**
CPC G06F 3/04883; G06F 9/45512
USPC 719/320; 715/863
See application file for complete search history.

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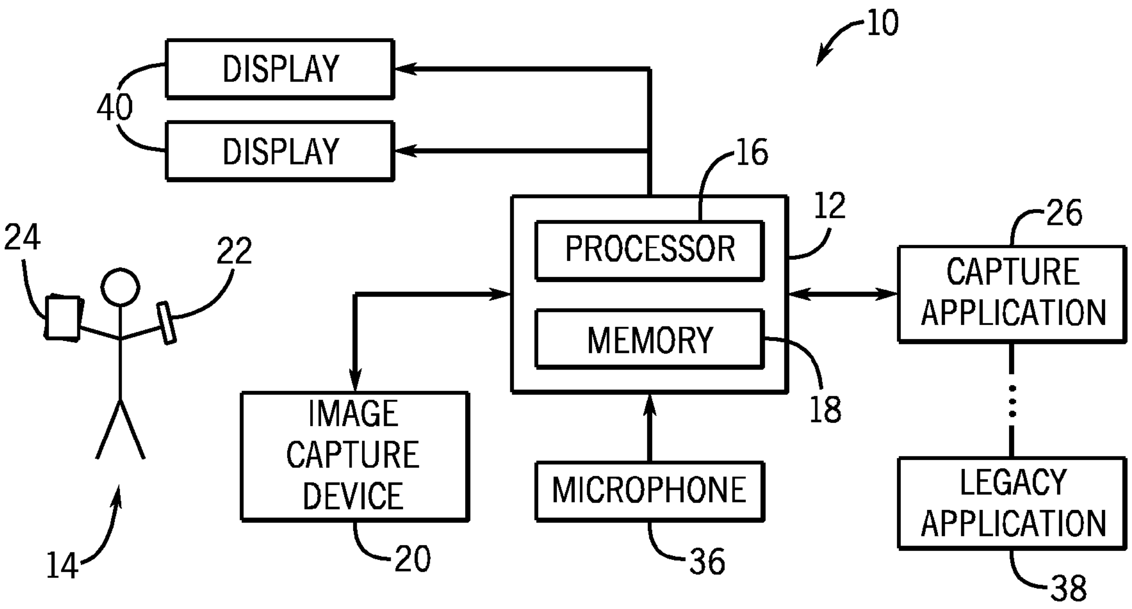
(57) **ABSTRACT**

A method is provided for controlling a legacy application. The method includes visually capturing a series of movements. The method also includes recording the series of movements at a first time as a recorded series of movements. Moreover, the recorded series of movements includes at least a command that is configured to control a legacy application. Furthermore, the method includes invoking the recorded series of movements at a second time.

20 Claims, 3 Drawing Sheets



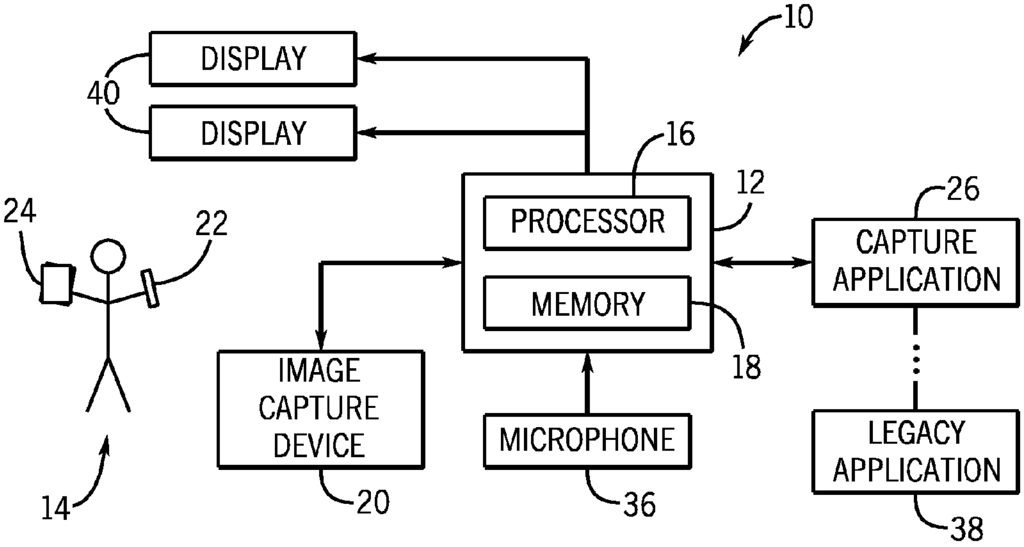


FIG. 1

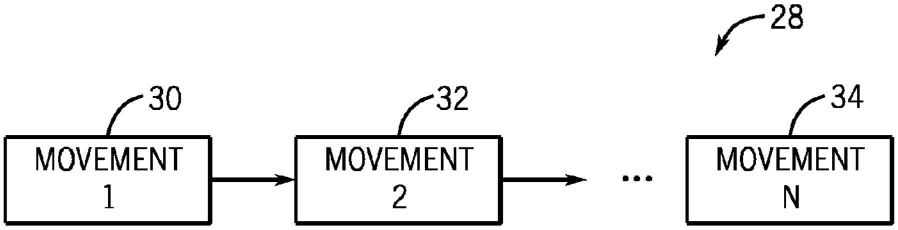


FIG. 2

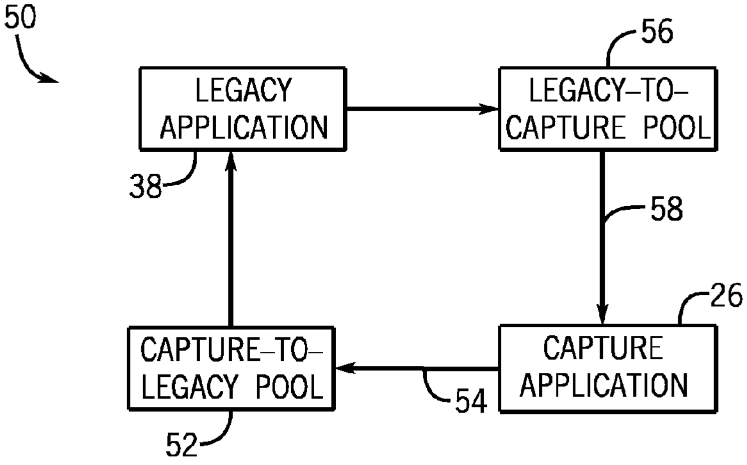


FIG. 4

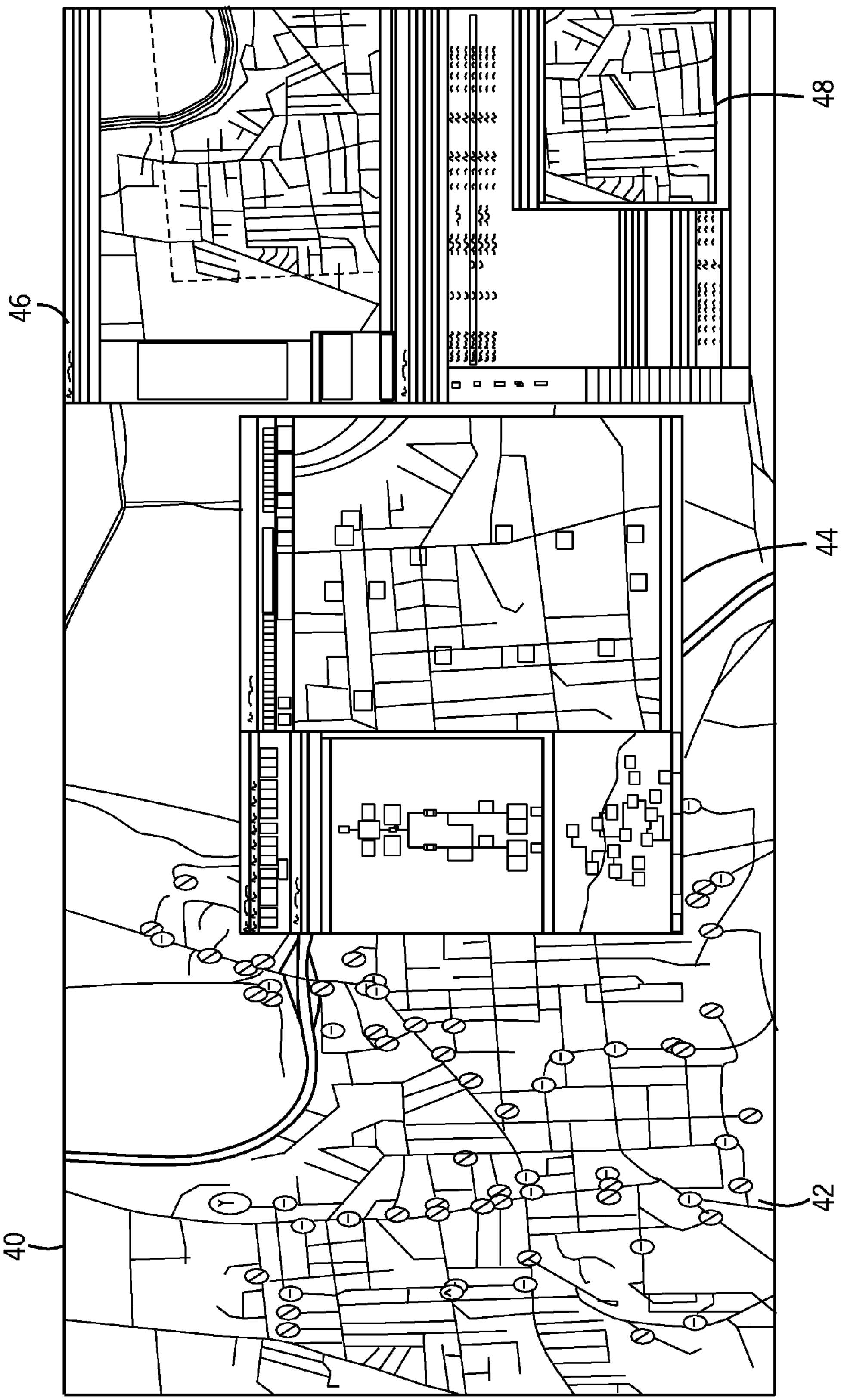


FIG. 3

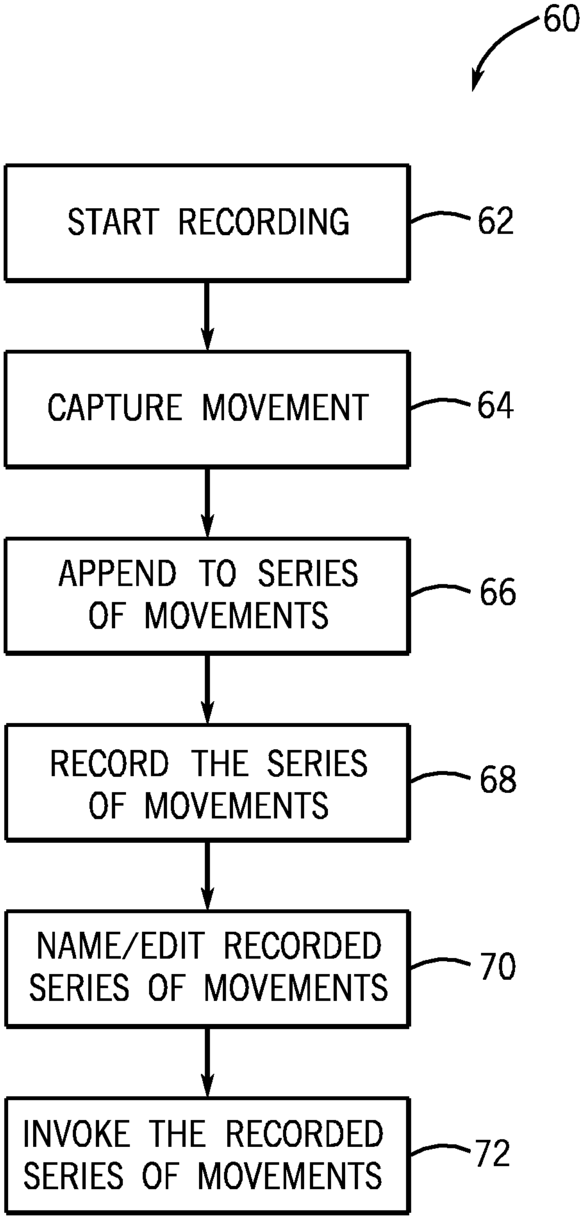

60
START RECORDING
62
CAPTURE MOVEMENT
64
APPEND TO SERIES OF MOVEMENTS
66
RECORD THE SERIES OF MOVEMENTS
68
NAME/EDIT RECORDED SERIES OF MOVEMENTS
70
INVOKE THE RECORDED SERIES OF MOVEMENTS
72

FIG. 5

METHOD AND SYSTEM FOR INTEGRATING VISUAL CONTROLS WITH LEGACY APPLICATIONS

BACKGROUND OF THE INVENTION

The subject matter disclosed herein relates to integrating visual controls with legacy applications.

Computer control applications may be used to control industrial systems. These computer control systems may be also be used to control various computer applications (e.g., power network management applications). However, often these computer control applications (e.g., legacy applications) may not suitably interface with newer computer control applications (e.g., applications using visual controls). Thus, to use such legacy computer applications with a visual computer control application, the legacy computer applications and/or the visual computer control applications often must be modified to create an interface (e.g., application programming interface [API]) suitable for communicating between the two applications. However, creating the API and/or modifying the legacy computer application and/or the visual control application to interface between the applications can be costly and time intensive.

BRIEF DESCRIPTION OF THE INVENTION

Certain embodiments commensurate in scope with the originally claimed invention are summarized below. These embodiments are not intended to limit the scope of the claimed invention, but rather these embodiments are intended only to provide a brief summary of possible forms of the invention. Indeed, the invention may encompass a variety of forms that may be similar to or different from the embodiments set forth below.

In one embodiment, a method for controlling a legacy application includes visually capturing a series of movements. The method also includes recording the series of movements at a first time as a recorded series of movements. Moreover, the recorded series of movements includes at least a command that is configured to control a legacy application. Furthermore, the method includes invoking the recorded series of movements at a second time.

In another embodiment, a system includes at least one processor and a memory communicatively coupled to the at least one processor. The system also includes an image capturing device configured to record a series of movements as a recorded series of movements in the memory at a first time as a recorded series of movements. Moreover, the recorded series of movements includes at least a command that is configured to control a legacy application. Furthermore, the system includes an input interface configured to invoke the recorded series of movements at a second time.

In a further embodiment, a visual control apparatus includes an image capture device configured to capture a series of movements as a recorded series of movements. The visual control apparatus also includes a memory configured to record the series of movements as a recorded series of movements. Moreover, the recorded series of movements includes at least a command that is configured to control a legacy application. Furthermore, the visual control apparatus comprises a user interface configured to invoke or to edit the recorded series of movements.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood when the

following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

FIG. **1** illustrates a schematic view of an embodiment of a visual control system having a display and a capture application;

FIG. **2** illustrates a block diagram view of embodiments of a recorded series of movements that may be captured by the visual control system of FIG. **1**;

FIG. **3** illustrates an embodiment of the display of FIG. **1** illustrating legacy applications;

FIG. **4** illustrates a diagram view of an embodiment of a communication path between the legacy application and capture application of FIG. **1**; and

FIG. **5** illustrates a diagram view of an embodiment of a process for controlling the legacy application of FIG. **1** through the capture application of FIG. **1**.

DETAILED DESCRIPTION OF THE INVENTION

One or more specific embodiments of the present invention will be described below. In an effort to provide a concise description of these embodiments, all features of an actual implementation may not be described in the specification. It should be appreciated that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be appreciated that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure.

When introducing elements of various embodiments of the present invention, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

Control applications may use APIs to communicate with legacy applications. However, in certain systems, the use of APIs may be cumbersome and inefficient and/or the APIs may be costly to design and update. For example, certain visual control systems may capture visual movements (e.g., hand movements, facial expressions, wand movements) of a user, but a visual control system using APIs to interact with legacy applications might use specifically designed APIs for each legacy application for which the visual control system may communicate. The techniques disclosed herein provide for the capture of such movements and audio (e.g., voice commands) and use the movements to control legacy applications without making direct changes to the code of legacy applications or requiring the development of an API for the legacy application of the visual control system. Accordingly, different legacy applications may be controlled by the visual control system more efficiently than systems that use specific API development for each interface for each legacy application. Additionally, the techniques include saving, editing, and/or naming the series of movements that may be recalled by a user at a later time. By saving and recalling a recorded series of movements, the visual control system allows a user to be more productive by allowing the user to invoke commands without performing each of the precise movements used to achieve a desired result.

FIG. **1** illustrates an embodiment of a visual control system **10** that includes a computing device **12** that may be capable of capturing movements of a user **14** and translating the movements into useable commands. In certain embodiments, the computing device **12** may include a personal computer (e.g., a laptop or a desktop), a server, a workstation, a netbook, a personal digital assistant, a mainframe, a tablet computer, a cellular phone, and/or another suitable processor based-device. In various embodiments, the computing device **12** includes a processor **16** and a memory **18** either included in the computing device **12** or accessible to the computing device **12** through a network connection, such as local area network (LAN) connections, wide area network (WAN) connections, Internet connections (cloud computing connections), wireless connections, wired connections, or other connections (e.g., Bluetooth connections, personal area networks (PANs), near field communication (NFC) networks). In certain embodiments, the processor **16** may include more than one processor. Moreover, the processor **16** may refer to a central processing unit (CPU), microprocessor, graphics processing unit (GPU), front end processor, another suitable processor, and/or a combination thereof. Similarly, the memory **18** may include volatile memory (e.g., random accessible memory (RAM)) and/or non-volatile memory. Additionally, the various embodiments of the invention include storing the below described functions in the memory **18** as instructions and executing the instructions using the processor **16**.

The visual control system **12** also includes an image capture device **20** that may be integrated within the computing device **12** or peripheral to the computing device **12** (e.g., connected via a universal serial bus or other connection, such as the connections mentioned above). In various embodiments, the image capture device **20** may include any device capable of capturing video images such as a video camera, still camera, webcam, scanner, or other suitable devices. In certain embodiments, the computing device **12** may control the image capture device **20**, so that the processor **16** controls various parameters of the image capture device **20**. For example, the image capture device **20** may be capable of toggling between capturing video images and still images, may activate or deactivate the image capture device **20**, zoom the image capture device **20**, pan the image capture device **20**, alter frequency (e.g., frame rate) or resolution of the captured images, and/or adjust various suitable properties of the image data captured by the image capture device **20**. In some embodiments, the processor **16** is capable of optimizing and/or otherwise altering the image data prior to storing the image data in memory **18**.

As depicted, the visual control system **10** may be optimized to capture movements of the user **14** by detecting movements of the user **14**. For example, in some embodiments, the visual control system **10** may be configured to interpret hand movements of the user **14** to derive a gestural reduced instruction pose expression (GRIPE) notation, Labanotation, Hamburg Notation System (hamnosys), signing gesture markup language (SIGML), and/or other notations that may then be used to store the user movements (e.g., GRIPE movement list) in the memory **18**. Additionally or alternatively, some embodiments of the visual control system **10** may be configured to track the movement of a presentation wand **22** in addition to or instead of tracking movement of hand movements. In certain embodiments, the wand **22** may assist in tracking hand gestures more precisely. For example, the wand **22** may transmit a signal (e.g., infrared light, colored light, radio waves) that may be tracked by the visual control system. In some embodiments, the presentation wand **22** may also be configured to control presentations, manipulate on-screen content, control image capturing, emphasize portions of a presentation (e.g., laser pointer), and/or other presentation functions. In certain embodiments, the visual control system **10** may be configured to receive and/or record information from one or more presentation wands **22**. Moreover, in some embodiments, one or more presentation wands **22** may be included as part of a mobile computing device **24** or other input device configured to interface with the computing device **12**. In such embodiments, the mobile computing device **24** may include a cellular phone, a tablet computer, a laptop computer, a personal digital assistant, or other similar devices

As further discussed below, the computing device **12** includes a capture application **26** including non-transitory machine readable computer instructions stored in memory **18** and executed by the processor **18**. This capture application **26** may control the image capture device **20** via the processor **18**. In certain embodiments, the capture application may include one or more applications stored in the memory **18**. For example, the capture application **26** may include a separate program that the user **14** may select, or the capture application **26** may be embedded within an operating system for the computing device **12** and/or embedded within firmware and/or drivers for the image capture device **20**. The capture application **26** may interface with a legacy application **38**, for example, by using a series of recorded movements and other techniques described in more detail below with respect to FIG. **2**. Indeed, rather than use an API or custom interface code, the techniques described herein may capture visual movement and use the captured movement to control and/or interface with the legacy application **38**.

FIG. **2** illustrates a block diagram view of an embodiment of a recorded series of movements that may be recorded by the capture application **26**. Once certain movements of the user **14** (e.g., hand movements, facial expressions, body movements, and/or wand **22** movements) are captured via the image capture device **20**, the captured movements of the user **14** are recorded within the memory **18** as a recorded series of movements **28**. The captured movements may include static movements (e.g., a hand position, palm orientation, thumb orientation, wand orientation) and/or dynamic movements (e.g., a hand movement up; down; left; right; a wave; rotation of the wrist, change in orientation of fingers, palm, and/or wand). For example, the series of movements **28** may include a first movement **30**, a second movement **32**, and a last movement **34**. In other embodiments, the recorded series of movements may include 1, 2, 3, 4, 5, or more movements, e.g., 1 to 100 or more movements. In some embodiments, the recorded series of movements **28** may be stored as individual movements of the user **14** (e.g., store using GRIPE notation) or the movements may be converted to some other data format prior to storing the commands in the memory **18**. For example, in some embodiments, the movements may be converted to and stored as commands that may be used by the capture application **26**. Moreover, in some embodiments each movement **30**, **32**, and **34** of the recorded series of movements **28** may correspond to one command in one-to-one ratio between movements and commands for an application, such as the legacy application **38**.

In other embodiments, at least one command may correspond to multiple movements. Additionally or alternatively, multiple commands may correspond to a single movement. In some embodiments, the commands may include commands to: start recording, stop recording, select a menu item, advance through a menu, open additional programs, zoom and pan within windows, resize windows, open windows, close windows, and/or other suitable application manipulations. Additionally, in certain embodiments, the recorded series of movements **28** may include a pre-determined number of commands (e.g., 1, 2, 3, or more commands). Other embodiments of the recorded series of movements **28** may include user defined limits to the number of movements. For example, in such embodiments, the first movement **30** may correspond to a start recording command, and the last movement **34** may correspond to a stop recording command. In such embodiments, the first movement **30** and/or the last movement **34** may be concatenated from the recorded series of movements **28** before the recorded series of movements **28** is saved in the memory **18**.

Returning to FIG. **1**, in addition to the image capture device **20**, the visual control system **10** may include a microphone **36** that is configured to capture audio signals, such as voice commands uttered by the user **14**. In such embodiments, the processor **16** is capable of storing the audio signals in addition to captured movements of the user **14**. In certain embodiments, the audio signals may be stored separately from the stored movements and may be accessed when the recorded series of movements **28** recorded along with the audio signal is accessed. In other embodiments, the audio signals may be converted to a movement and stored within the related recorded series of movements **28**. Indeed, the audio signals may be used in lieu of or additional to visual movements, but may be converted and stored into movements by the techniques described herein. For example, an audio command like "zoom in" may be converted to an equivalent "zoom in" visual movement and stored as the "zoom in" visual movement. Any number of audio commands, such as "record," "stop," and "select" may be converted and stored as a movement. Indeed, the audio signals and the movements may both be converted to similar data formats (e.g., GRIPE) and stored in the memory **18**. For example, the movements and audio signals may be translated to and stored as commands that may be used by the capture application **26**. To insure that the audio and visual commands are received in proper order, some embodiments may synchronize the audio visual commands during recording so that an earlier issued command (e.g., either audio or visual) is stored prior to a later issued command (e.g., audio or visual command).

In certain embodiments, the recorded series of movements **28** may be used to control the capture application **26**. As mentioned above, the capture application **26** may record the recorded series of movements **28** and/or control the legacy application **38** that may be communicatively connected to the capture application **26**. In some embodiments, the capture application **26** may be suitable of performing other functions in addition to capturing the movements **30**, **32**, **34** of the user. For example, in some embodiments, the capture application **26** may be used to enable teleconferencing through the computing device **12** and/or provide operating system functions (e.g., save file, open file, print file, launch application, close application) for the computing device **12** while incorporating a capturing function embedded within the capture application **26** suitable for capturing the movements **30**, **32**, and **34**. In other words, the capture application **26** may be any application that is configured to receive controls from the user **14** through image capture device **20** and/or microphone **36** such as the Mezzanine™ platform made available by Oblong Industries, Inc., of Los Angeles, Calif. The legacy application **38** communicatively coupled to the capture application **26** may include Sluice or GeoView both available from General Electric Company of Schenectady, N.Y. However, in some embodiments, the user **14** may desire to perform actions that may not be provided in the capture application **26**, or the user **14** may to desire to control an additional application, such as additional legacy applications **38**.

In certain embodiments, the legacy application **38** may include any application that is not incorporated within the capture application **26**. For example, the legacy application **38** may include power network management applications such as Sluice, GeoView, GENe, XA/21 and the PowerOn™ suite each made available by General Electric Company of Schenectady, N.Y., as well as other similar network management applications. Specifically, the applications may include Energy Management Systems (EMS) applications, Demand Response Management Systems (DRMS) applications, Distribution Management Systems (DMS) applications, Outage Management Systems (OMS) applications, Geospatial Information Systems (GIS) and/or other suitable power network management applications.

Furthermore, the illustrated computing device **12** may include one or more displays **40** that may display information provided by the computing device **12**. For example, the display **40** may display information provided by the capture application **26**, the legacy application **38**, other applications stored in the memory **18** and/or other applications wirelessly connected to the computing device **12**. Moreover, the illustrated embodiment of the computing device **12** couples to two displays, but other embodiments of the computing device **12** may couple to 1, 3, 4, or more displays **40** configured to display information provided by the computing device **12**. The displays **40** may share a single workspace displayed across multiple screens. Further, each display **40** may be included in a monitor, a tablet, a cell phone, a laptop, a screen projector, a web browser and so on. A workspace may enable different users communicatively coupled via a network to share content and applications interactively with any other user, including users at other geographic locations. For example, a first user may take control of the wand **22** (and/or use hand and other body gestures) at a first geographic location and use the wand **22** (and/or hand and other body gestures) to interactively control any number of applications in the workspace, which may be displayed by all displays **40**. A second user at a second geographic location may then ask for or receive control of the workspace, and similarly take interactive control of the workspace. The second user's actions may then be presented by all of the displays **40**. Indeed, application sharing, whiteboarding, video conferencing, and real-time collaboration may be provided by using a shared workspace, including sharing the workspace in various geographic locations.

It may be useful to describe more details of the legacy application(s) **38**, such as legacy applications **38** useful in power network management. Accordingly, FIG. **3** illustrates an embodiment of the display **40** illustrating various legacy applications **38**. The capture application **26** may be used to control any one or more of the legacy applications **38**. For example, in some embodiments, the legacy applications **38** may be displayed on or more displays **40**. For example, in some embodiments, the display **40** may be used to display all of the legacy applications **38**. In such embodiments, the legacy applications **38** may be executed on a single computing device (e.g., computer or server). In other embodiments, one or more of the legacy applications **38** may be executed on one or more computing devices and combined on one display **40**. For example, video from one or more computing devices may be combined on the display **40** using video muzzling, such as the window sharing capabilities integrated in the Mezzanine™ platform. In further embodiments, the displayed legacy applications **38** may be distributed across one or more displays **40**.

In certain embodiments, the display **40** may display one or more legacy applications **38**. Although the illustrated embodiment of the display **40** shows 4 legacy applications **38**, other embodiments are configured to concurrently display 1, 2, 3, 5, 6, or more legacy applications **38**. In the illustrated embodiment of the display **40**, the displayed legacy applications **38** include Insight **42**, a DMS application **44**, a GIS application **46**, and an OMS application **48**. Other embodiments of the display **40** may include one or more other suitable power network management systems in addition to or in place of one or more of the illustrated legacy applications **38**. For example, the legacy application **38** may include an EMS application that may be used to centrally monitor, analyze, optimize, simulate and control generation and transmission assets in real time. A DRMS application may be used to dispatch load resources according to demand to optimally achieve load demand while taking various risks and rewards of a dispatch plan into the optimization. The DMS application **44** may be used to manage renewable generation of power, implement grid efficiency improvement measures, and control isolation and restoration of outages. The GIS application **46** may be used to model network infrastructures that may experience complex network asset management problems, such as electrical, telecommunications, gas, water, and public utilities. The OMS application **48** may be used to provide network management and advance workflow outage restoration support during storm conditions.

FIG. **4** illustrates an embodiment of a communication path **50** between the capture application **26** and a legacy application **38**. The capture application **26** may include various tools to integrate pixels recorded by the capture application **26** with actions of the legacy application **38**. For example, movements captured by the capture application **26** may be sent as a list of commands (e.g., mouse clicks, mouse movements, keyboard presses, and/or keyboard shortcuts derived from movements recorded in the capture application **26**) that may be sent to the legacy application **38**. Specifically, the capture application **26** captures movement commands from the user and stores the movements and/or sends them to a capture-to-legacy pool **52** as one or more proteins **54**.

The proteins **54** may be similar to data structures, albeit more flexible, and may contain information deposited by the capture application **26** several times per second, for example, at a frequency of approximately 10-50 Hz, into the pool **52**. Proteins **54** may be made up of two parts (each one being a slaw): descrips and ingests. Descrips may be slaw strings, and ingests may be key-value pairs, where the key is a string. Slaws are data units having the ability to store multiple types of data, including an unsigned multi-bit integer (e.g., 64 bit integer, 128 bit integer), complex number, boolean, vector, string, and/or a list. In some embodiments, the protein **54** may be composed of one or more data structure units that are arbitrarily composed but may be self-describing, structured, and/or typed. An example protein **54** format is as follows:

```
Protein Format
Descrips:
  remote-pointing
  version.2.0
Ingests:
  provenance: [string]
    This string identifies the input device, so that the application can deal with multiple concurrent input streams.
  touch: [integer 0..2]
    This ingest represents the current interaction state:
      0=the user is not touching the display/not moving the pointer
      1=the user is touching the display/moving the pointer
      2=the user is hardening/dragging (button pressed)
  mode: [integer 0..1]
    This ingest contains information regarding how to interpret the values in vect (see below):
      0=pointing updates are relative
      1=pointing updates are absolute
  vect: [three floating point components vector]
    This ingest contains pointing move information. Instantaneous (if mode==0) or absolute (if mode==1) values for the horizontal and continuous pointing motion are stored in the first and second component of the vector. The third component is not currently used. The values represent either the linear or angular change along a specific axis since the last protein.
  swipe_direction: [integer 0..4]
    This ingest contains discrete swipe information. This value will almost always be zero (i.e. no swipe), and will have a value between 1 and 4 if a discrete swipe is detected. Discrete swipes are only detected and sent when the user is not hardening (see above). These are the meanings for the different values:
      0=no swipe
      1=swipe up
      2=swipe right
      3=swipe down
      4=swipe left
  swipe_x: [floating point]
  swipe_y: [floating point]
    This ingest contains instantaneous values for the horizontal and continuous swipes, the values, either linear or angular depending on the implementation, represent the change since the last protein, and are measured and sent only if the user is hardening (see above).
  angle: [floating point]
    This ingest contains the absolute (roll) angle (in degrees) around the main axis of the device. The angle is reset to zero every time the user touches the display/starts to send pointing motion data.
  number-of-touches: [integer]
    This ingest contains the number of fingers currently touching the device display. Not currently used in any implementation.
```

An example protein **54** instance may be as follows:

```
% YAML 1.1
% TAG ! tag:oblong.com,2009:slaw/
— !protein
descrips:
  remote-pointing
  version.2.0
ingests:
  touch: 0
  vect: !vector [0.03338855504989624,
    0.0037169046700000763, 0.0]
  ratchet_state: 0
  swipe_direction: 0
  number-of-touches: 0
  provenance: iOS3f777e
  mode: 0
  swipe_y: 0.0
  angle: 59.585534966724609
  swipe_x: 0.0
```

The capture-to-legacy pool **52** is a directional communication channel from the capture application **26** to the legacy application **38**. The pool **52** may be a multi-point contact that allows one or more legacy applications **38** to connect to the pool **52** along with the capture application **26** without making any changes to any other applications connected to the pool **52**. In some embodiments, the capture-to-legacy pool **52** may be implemented as a ring buffer (e.g., a circular data structure using a buffer as if it were connected end-to-end). Although the pool **52** contains proteins **54** that are arbitrarily composed (e.g., contain any type of data), the pool **52** may control the order of data sent from the capture application **26** to one or more legacy applications **38**. For example, in some embodiments, the pool **52** may be used as a queue that sends data to one or more legacy applications **38** in the order sent from the capture application **26**. In certain embodiments, the data may be sent from the pool **52** to one or more legacy applications **38** upon receiving each movement from the capture application **26**. In other embodiments, a batch of movements may be sent after a certain number of movements have entered the pool **52**. For example, in some embodiments, data may be sent from the pool **52** to the legacy application **38** after a set number of movements have occurred, such as 2, 3, 4, 5, or more movements. In other embodiments, data may be sent from the pool **52** to the legacy application **38** after a full command is detected, such that commands composed of one movement are sent after the one movement is detected by the computing device **12**, but multi-movement commands are received after the full string of movements composing a command is detected by the computing device **12**. As discussed below, the recorded series of movements **28** may be invoked by the user **14**. When the user **14** invokes the recorded series of movements **28**, the recorded series of movements **28** may be invoked and sent as one packet of data to the legacy application **26** at one time. As can be appreciated, invoking the recorded series of movements **28** may be faster that the user's movements, thereby increasing the efficiency of the user while operating the computing device **12**.

In addition to sending information from the capture application **26** to the legacy application **38**, return information may be sent through the communication path **50** through the legacy-to-capture pool **56** as a protein **58**. The legacy-to-capture pool **56** may be constructed similarly to pool **52**, and the protein **58** may be similar to the protein **54**. The return information may include displayed images, queries, and/or responses to the commands sent via pool **52**. For example, the legacy application **38** may ask for additional information and/or show more available navigation choices after a command is sent from the capture application **26** to the legacy application **38**. In some embodiments, the capture application **26** may present the information to the user and/or capture more movements from the user to navigate through and/or control the legacy application **26**. By utilizing, for example, a round-robin approach to send and receive data via the pools **52** and **56** in a circular fashion, the techniques described herein enable a more efficient interface between the legacy application **38** and the capture application **26**.

FIG. **5** illustrates an embodiment of a process **60** for controlling a legacy application **38** through the capture application **26**. The process **60** may be included in non-transitory computer instructions or code stored in a machine-readable medium, such as the memory **18**. The process **60** may begin by starting a recording of movements (block **62**). In some embodiments, the recording begins when the user **14** initiates recording using the image capture device **20**, the wand **22**, the mobile computing device **24**, the microphone **26**, and/or another suitable input device, such as when the first movement **30** corresponds to a start recording command. The captured movements may be stored in the memory **18** using GRIPE and/or another suitable notation. In other embodiments, recording begins upon the detection of a movement. Before or after recording, the processor **16** may cause the motion capture device **20** to capture movements of the user **14** (block **64**). The recorded movement may then be used to create a new series of movements or appended to a recorded series of movements **28** already stored in memory **18** (block **66**).

The recorded series of movements **28** then may be recorded to the memory **18** using GRIPE or another suitable notation (block **68**). In some embodiments, the recording of the movements **28** may be first converted to a corresponding series of commands (e.g., clicks through a navigation pane, mouse movements, keyboard presses, and/or keyboard shortcuts derived from movements recorded in the capture application **26**). Once the series of movements are recorded (block **68**), the processor **18** enables the user to name the series of movements and/or edit the series of movements (block **70**). In some embodiments, upon recording the movements, the processor **18** causes one or more displays **40** to present a user interface to the user **14** and/or causes the mobile computing device **24** to present a user interface configured to edit the recorded series of movements **28**. In other embodiments, the series of movements is recorded and a user may invoke a menu that allows the user to edit or name the recorded series of movements using the computing device **12**, the mobile computing device **24**, or a remote computing device connected to the computing device **12**. For example, the recorded movements **28** may be reordered, certain movements may be deleted, certain movements may be added, and certain movements may be updated. Likewise, data in the proteins **54**, **58** may be edited (e.g., updated, inserted, deleted). Once the series of movements has been recorded, the processor **18** presents a menu via the display **40** and/or the mobile computing device **25** that enables the user to invoke the recorded series of movements (block **72**).

Additionally or alternatively, in some embodiments, the conversion of the series of movements may be edited such that the significance of recorded movements may be altered. In other words, the correspondence between gestures and commands may be changed. For example, a gesture that may correspond to a click in a navigation window may be redefined as a scrolling action or another command in the legacy application. For example, a specific movement of the thumb when the hand is in a certain position may be mapped to any number of different legacy application **38** commands.

Technical effects of the invention include using movements to control legacy applications without making direct changes to the code of legacy applications or developing an API for the legacy application **38** and/or the capture application **26**. Accordingly, different legacy applications **28** may be interchanged more quickly and more cheaply than systems that use special API development for each interface between a legacy application **38** and a capture application **26**. Additionally, the series of movements may be saved, edited, and/or named to be recalled by a user to control the legacy application **38**. By saving and recalling a recorded series of movements **28**, user productivity may be increased due to less time used to perform precise movements to achieve a desired result whether the desired result includes navigating or controlling the legacy application **38**.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

The invention claimed is:

1. A method for controlling a legacy application, comprising:
   - visually capturing a series of movements;
   - recording the series of movements at a first time as a recorded series of movements, wherein the recorded series of movements comprises at least a command that is configured to control a legacy application;
   - editing the recorded series of movements, wherein the recorded series of movements comprise visually captured movements of a user comprising two or more recorded gesture types; and
   - invoking the recorded series of movements at a second time.

2. The method of claim **1**, wherein editing the recorded series of movements is performed at a third time.

3. The method of claim **2**, wherein editing of the recorded series of movements comprises using a mobile computing device.

4. The method of claim **1**, wherein recording the series of movements comprises receiving user input to record a name for the recorded series of movements.

5. The method of claim **1**, wherein recording the series of movements comprises using an image capturing device.

6. The method of claim **5**, wherein using the image capturing device comprises using a wand configured to assist the image capturing device in capturing the series of movements.

7. The method of claim **1**, wherein recording the series of movements comprises capturing voice commands and integrating the voice commands into the recorded series of movements.

8. The method of claim **1**, comprising controlling a legacy application by using the recorded series of movements and without using a legacy application programming interface configured to control the legacy application, wherein the legacy application is configured to manage an electrical network.

9. A system, comprising:
   - at least one processor;
   - a memory communicatively coupled to the at least one processor;
   - an image capturing device configured to record a series of movements in the memory at a first time as a recorded series of movements, wherein the recorded series of movements comprises at least a command that is configured to control a legacy application;

   - an editing interface configured to enable a user to edit the recorded series of movements, wherein the recorded series of movements comprise visually captured movements of a user comprising two or more recorded gesture types; and
   - an input interface configured to invoke the recorded series of movements at a second time.

10. The system of claim **9**, wherein the input interface comprises a mobile computing device remote from the at least one processor.

11. The system of claim **10**, wherein the mobile computing device comprises an editing interface configured to edit the recorded series of movements.

12. The system of claim **9**, comprising a microphone configured to capture voice commands associated with the series of movements.

13. The system of claim **9**, wherein the legacy application is configured to manage an electrical network.

14. The system of claim **9**, wherein the at least one processor derives a plurality of user interface commands configured to navigate through a user interface included in the legacy application based on the recorded series of movements.

15. The system of claim **14**, wherein an execution of the plurality of user interface commands by the at least one processor is faster than a playback of the recorded series of movements by the at least one processor.

16. The system of claim **9**, comprising a display, wherein the series of movements comprises movements where a user is not touching the display.

17. A visual control apparatus, comprising:
   - an image capture device configured to capture a series of movements;
   - a memory configured to record the series of movements as a recorded series of movements, wherein the recorded series of the movements comprises at least a command that is configured to control a legacy application;
   - an editing interface configured to enable a user to edit the recorded series of movements, wherein the recorded series of movements comprise visually captured movements of a user comprising two or more recorded gesture types; and
   - a user interface application configured to invoke or to edit the recorded series of movements.

18. The apparatus of claim **17**, wherein the legacy application is configured to manage an electrical network.

19. The apparatus of claim **17**, comprising a communication interface configured to transport the recorded series of movements to the legacy application through one or more pools as a protein.

20. The apparatus of claim **19**, wherein each pool is a queue implemented as a ring buffer, and wherein the protein is a self describing data structure unit.

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